

A REVIEW OF THE GENUS *ERISTALIS* LATREILLE IN NORTH AMERICA.

PART II.*

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The studies below represent a continuation of those which were published in the *OHIO JOURNAL OF SCIENCE* a short time ago. In all, seven species have been described as new. These represent species which the writer has been unable to place in existing descriptions. These older descriptions, however, of unrecognized species, are in no slight degree vague and indefinite, and in few cases is one able to feel sure of their characterization. Hence, it is not entirely impossible that when the types of these old species are examined (according to the evidence of several authors, some of these are no longer in existence), one or two of the present described species may be found identical. Many of the old descriptions, are, as has been noted by others, a characterization more applicable to a genus or a group, rather than to any definite species.

Mention was made in Part I of these studies, of a discussion of the remaining unrecognized species from North America. It has not been found practical to include this here and the treatment of these remaining forms has been reserved for a future paper.

THE SCUTELLARIS GROUP.

(Group description.)

The forms placed here make a rather unique group, distinguished chiefly by their elongated abdomen and thickened hind femora. Unlike the species of the following group, while sometimes brilliantly marked with yellow, they are usually, for the larger part black or brown.

Of moderate size to large; very scantily and short pilose. Head more or less hemispherical, slightly variable in shape. Eyes pilose on the upper half. Frontal triangle just above the antennæ, obtusely projecting in the male; slightly projecting in the female. Antennæ of the usual size; arista bare.

* Part I, see this Journal: Vol. XXV, p. 11, Jan., 1925.

Thorax opaque, transversely fasciate, and often marked by shining cross bands. Abdomen long and slender, widest on the second segment, thence tapering posteriorly. Hind femora considerably thickened; hind tibiae flattened and arcuate, with a sharp apical spur.

The above assemblage of characters will be seen to embrace those used by Williston to designate his species of *Doliosyrphus*, a genus hardly tenable, based as it is, chiefly on the protruding frontal prominence of the male. This is to be found to but a slight extent, in the females. The elongate condition of the abdomen is found to have intermediate forms in such species as *æmulus*, *agrorum*, and *spectabilis*. While these forms are readily placed within the group, they are but little more elongate than the usual *Eristalis*.

KEY TO THE SPECIES OF THE *Scutellaris* GROUP.

1. Hind femora yellowish to reddish.....*precipuus* Will.
Hind femora black or brown.....2
2. Velvet black bands of thorax broken up into spots.....*cyatheus* sp. n.
Velvet black bands continuous.....3
3. Scutellum in a large part black.....*volaticus* Will.
Scutellum not in large part black.....4
4. Scutellum brown in color.....5
Scutellum wholly yellow.....6
5. Light spots on the third and fourth segments of the abdomen.....*æmulus* Will.
Fourth segment, and usually whole of third segment, black.....*spectabilis* n. sp.
6. Third joint of antennæ light yellowish red.....*agrorum* Fabr.
Third joint of antennæ black or nearly so.....7
7. Median opaque stripe of second segment of abdomen does not reach the
posterior band; hind tibiæ reddish to brown (female).....*conicus* Fabr.
Median opaque stripe of second abdominal segment reaches the posterior band;
hind tibiæ black or nearly so.....8
8. Margins of scutellum fringed with dense stubby black pile. (Male, female).
conicus Fabr.
Scutellum not thus fringed; only scattering brownish hairs.....*scutellaris* Fabr.

Eristalis precipuus Will.

(Plate I, Fig. 8.)

Male; female. Antennæ dark reddish brown. Bare area of cheeks, narrow; together with facial stripe, shining dark brown. Pile of face dense, appressed, silvery, totally obscuring the ground color. Pile of lower half of front, just above antennæ, black. Thorax opaque gray, marked as follows: an opaque velvet black band extending between the humeri, widely interrupted medianly; a second black band, practically continuous, immediately behind the suture. Immediately in front of this (presutural), is a very narrow, widely interrupted, silvery line or band; immediately behind the suture, a wide steely blue band. Pleuræ largely silvery gray pollinose. A small spot above the base of the wings likewise silvery gray pollinose. Scutellum yellow, narrowly black basally. Abdomen opaque black; second segment with a pair of large, quadrate yellow spots, reaching the margin in their full length. Third

segment with similar yellow spots, narrowly connected on the anterior margin. Fourth segment with a complete steel blue, shining cross band; median black of second and third segments extended along the posterior margin to the sides. Segments two, three and four with a narrow yellow posterior margin. Yellow spots of female often obsolescent, becoming metallic steel blue. Legs light yellowish brown; pile long, whitish. Last two joints of all the tarsi blackish, pile black. Wings nearly hyaline, slightly grayish. Length 15 mm.

Description drawn from one female; Sao Paulo, Brazil, (collection Mr. C. H. Curran), and the description by Williston, Trans. Amer. Ent. Soc., Vol. XV, p. 280. The typical specimens were from Chapada, Brazil.

Eristalis cyatheus n. sp.

(Plate I, Fig. 9; Plate II, Fig. 13.)

Female. Facial stripe and cheeks, shining, jet black. Face very scantily clothed with light, white pollen; black ground color plainly apparent. Facial stripe limited to the tubercle, the latter more prominent than in *scutellaris*. Pile of lower half of front, or just above antennæ, black. A few hairs below antennæ black, becoming white and more numerous along the sides, lower down. An opaque black band extending across the middle of front, to the margins of the eyes, and a band before and behind, silvery pollinose. Antennal prominence shining black, an opaque triangular black spot just above the apex directed towards the vertex. Antennæ lacking. Thorax dark gray, feebly shining, marked as follows: A large, opaque, velvet black spot in the anterior lateral corners of the dorsum, a wide anterior median black band (may be narrowly divided medianly) produced posteriorly, not reaching the suture, and a large, subtriangular, opaque black spot, just behind the suture, on either side. Pleuræ black, sparsely white pilose. Scutellum deep, opaque, velvet red. Abdomen shining black, with a slight steely blue cast, marked with opaque black as follows: A small, median, quadrate spot on the anterior margin of the second segment, together with a median interrupted band on the posterior margins of the third and fourth segments. Very narrow, yellow posterior margins, on segments two, three and four. All the femora shining black. All the tibiæ and tarsi yellowish red. Wings grayish hyaline, with a large blackish spot on the outer half, sharply defined basally. Length 15 mm.

One female, San Sebastian, Brazil. Type in the collection of Mr. C. H. Curran.

Eristalis volaticus Williston.

Male. Facial stripe, cheeks, and front, shining black. Face deeply obscured by dense, pale yellowish to whitish pollen. First and second joints of antennæ dark blackish brown, third light reddish; arista yellow. Thorax gray, feebly shining, marked vaguely by a large, opaque

black spot in each lateral anterior corner, almost continuous medianly, and a similar, broken band, just back of the suture; a median black stripe produced posteriorly, not reaching the suture. Pleuræ, black, largely dark brownish pilose. Scutellum yellow, wholly obscured, except for a small round spot apically, by dense, woolly or curly, velvet black or reddish brown pile. Second and third segments of abdomen wholly yellow, except as follows: a narrow, median black stripe, of uniform width, on both segments, interrupted on the posterior margin of the second, by the yellow posterior margins; in the second segment, slightly dilated posteriorly, in the third the dilation becomes a band, reaching the side margins of the segment. Fourth segment wholly black save for the narrow yellow posterior margin. All the femora wholly shining black. Basal half of tibiæ light yellowish brown, remainder of tibiæ and tarsi black; clothed with short, dense, whitish or yellowish hair. Wings clouded with brown, especially along the anterior margin. Length 9-11 mm.

One specimen, San Sebastian, Brazil, and a part of the Williston material, Chapada, Corumba, and Rio de Janeiro, studied.

Eristalis æmulus Will.

(Plate I, Fig. 1; Plate II, Fig. 18.)

Male, female. Antennæ dark brown, arista of the same color. Facial stripe and cheeks, shining reddish brown. Face obscured by dense, appressed, pale yellowish white pile and pollen, extending a part of the way up the front, along the eyes. Front dark brown, vertex black; pile dark. Thorax marked by four bands before the scutellum, the first three of nearly equal width, and continuous; between the humeri, an opaque gray band, immediately behind is an opaque black band, followed by a band with a strongly steel blue cast; immediately before the suture is found the usual, narrow, interrupted, white pollinose band or line. Just past the suture is a wide, black, continuous band; remainder of the thoracic dorsum, strongly steel blue. Scutellum light brown, feebly shining on the rim. Second segment of the abdomen light brown, subtranslucent, marked with black, or very dark brown, as follows: A median stripe of nearly equal width, continuous posteriorly with a narrow band on the posterior margin. Third segment of a similar color, with a wide posterior marginal band, and a round, median spot, black. Fourth segment sometimes with a small light spot on either side, widely separated by black; a shining cross band on the middle of the segment; other parts of abdomen opaque or very feebly shining. Sides of all the segments, very narrowly blackish; narrow, yellow, posterior cross bands present. Abdomen of a peculiar shape, very wide on the second segment, tapering slightly and very suddenly tapering on the third segment; fourth segment less than a third the width of the second, tapering slightly. Abdomen not very greatly longer than broad. Legs more or less evenly dark brown, shining; tibiæ and tarsi lighter in color. Wings with the usual brown clouds apically. Length 14 mm.

Recorded by Williston, from Mex., Guatemala, and Panama. Nine specimens, from Bartica, British Guiana, June, July. Collections of Ohio State University and Mr. C. H. Curran.

The difference in the contiguity of the eyes of the male, between this species and *agrorum*, is very slight indeed. Williston further describes the hind femora of *æmula* as slenderer than *agrorum*; actually it is the reverse, though the difference is slight. There is moreover, in *æmulus*, a slight, elongate protrusion, on the lower surface of the hind femora, apically, lacking in the other species; the hind tibiæ are more arcuated.

Eristalis spectabilis n. sp.

(Plate I, Fig. 2.)

Female. Antennæ dark reddish brown; arista of the same color. Facial stripe and cheeks shining black. Ground color of face densely obscured by appressed, silvery pile. Front blackish, pile black. Thorax gray, moderately shining, marked by an opaque, velvet black band, continuous between the humeri, and a similar, wider band just behind the suture. Just before the suture, is a widely interrupted, very narrow, silvery pollinose band. Scutellum brown, slightly shining. Abdomen black, largely shining; marked as follows: Two, large, subquadrate, or roughly oval, dark shining, slightly reddish brown spots on the second segment, separated medianly by chiefly opaque black stripe, the latter continuous with a black posterior margin. Small spots of the same color as those on the second, in one specimen, on the anterior margin of the third segment, widely separated by black. Black of third and fourth segments shining, a small median spot anteriorly on the third, opaque. Side margins of all the segments black. Usual narrow yellow posterior bands present. Legs shining black; tibiæ dark brow, lighter basally. Wings heavily clouded with brown, especially on the apical half. Length 15 mm.

Type female and two paratype females, Caura Val., Venezuela, collection of C. H. Curran. The species resembles somewhat, a very blackish, smoky, *vinetorum*, but is very different in a number of respects, besides being elongate. It is, however, not very greatly elongate, and resembles *æmulus* in this respect, the drawn out fourth and fifth segments contributing to this appearance. Much darker and blacker than the preceding species. The male probably resembles *æmulus* in shape.

Eristalis agrorum Fabr.

(Plate I, Fig. 3.)

Male, female. Antennæ and facial stripe light brownish red; cheeks very dark, shining, brownish red. Front, shining, dark reddish brown,

above antennæ, becoming more opaque and brownish black towards the vertex. Face obscured by dense, appressed, pale yellowish white pile and pollen. Thorax nearly opaque, slightly brownish or yellowish gray, marked by black as follows: A narrow continuous band between the humeri; a similar band, about three times the width of the first, immediately behind the suture, slightly crescentic; narrow, white, pollinose, interrupted band before the suture, scarcely present. Scutellum yellow, opaque, sometimes tinged with red. Second abdominal segment yellow, marked by a rather slender, median, black stripe, wider in the female, usually more slender posteriorly, and continuous with a quite narrow, sometimes obsolescent, posterior marginal band. Third segment likewise yellow, with a black, posterior marginal band; in the male, with median, contiguous, round black spot on the anterior margin, and in the female, a similar, quadrate spot. Fourth segment wholly black, with a transverse, medianly interrupted, metallic cross band. Segments two, three and four, with narrow yellow hind margins. Femora shining black; hind tibiæ dark brown, front tibiæ, and middle tibiæ more extensively, pale yellowish basally. Tarsi black. Wings nearly hyaline, sometimes slightly infuscated. Length 15 mm.

Material studied consists of that recorded by Williston from Chapada, Brazil. The abdomen is not especially elongate, and is more flattened than is common among the genus. Similar to *vinetorum* especially in the markings of the thorax, but presenting numerous differences. In that species the scutellum is uniformly brown, as are the markings of the abdomen. In *agrorum*, while often tinged with red, the markings are distinctly yellow, at the most, tinged with brown. It is a rather light colored species.

Eristalis conicus Fabr.

(Plate I, Fig. 6.)

Male, female. Antennæ dark brownish black; third joint one and a half times as long as broad, arista reddish brown. Facial stripe, front and cheeks, shining black. Cheeks densely white pollinose, in the female extending narrowly up along the eyes, to nearly half the length of the front. Thoracic pattern similar to that of *scutellaris*. Scutellum yellow, heavily fringed on the margin with dense, stubby, black pile, wholly opaque. Median black band of second segment of the abdomen, not continuous in the female, with the posterior marginal black band of that segment, thus differing from the female of *scutellaris*. Abdominal markings otherwise as in *scutellaris*. All the femora shining black; hind tibiæ dark reddish brown; hind tarsi, front and middle tibiæ and tarsi, rather light brownish red. Wings heavily clouded, particularly on the apical half. Length 10-12 mm.

About thirty specimens studied. Recorded from Bartica, Kartabo, British Guiana; Rio de Janeiro, Chapada, Brazil;

and Livingston, Guatemala. Collection of C. H. Curran, Ohio State University and the author. A species remarkably close to *scutellaris*, but distinguished in the female, by the discontinuous, opaque black band of second segment, lighter colored tibiae and tarsi, and in the male, by the scutellum being always beset with dense black bristles, longer antennae, etc. They seem to differ fairly constantly in size.

Eristalis scutellaris Fabr.

(Plate II, Figs. 16, 19.)

Male, female. Antennae very dark brownish black, third joint slightly longer than broad; arista black. Front, facial stripe and cheeks, shining black. Face heavily obscured by dense silvery pollen. Pile of face and occiput, sparse, silvery; of front and vertex, black; of eyes, light, slightly reddish brown. In the female, the silvery facial pile extends narrowly up along the orbits, half the distance of the front. Thorax gray, feebly shining, marked as follows: a narrow, black, opaque band, continuous between the humeri, in one specimen extending widely, anteriorly, between the humeri; a second wider, similar band, immediately behind the suture, followed by a wide, shining steel band. Before the suture is found a narrow, widely interrupted, silvery pollinose band, in one specimen rather yellowish. Pleurae largely brownish gray, pale pollinose. Scutellum deep yellow, very narrowly black basally, wholly opaque. Abdomen opaque black, marked as follows: A pair of large, sharply quadrate, yellow spots on the second segment, separated medianly, from each other, and posteriorly from the margin, by a black band. Margins frequently narrowly black. Third segment similar. Fourth segment wholly black, a continuous, transverse, steely blue band in the middle. Segments two, three and four, with narrow yellow margins. Yellow spots of female usually obsolete; replaced by shining, steely blue. Legs shining black; anterior and middle tibiae largely dark shining red. Wings heavily clouded with black, particularly on the apical half. Length 14–16 mm.

Thirty-five specimens studied. A large and brilliantly marked species, with an extensive synonymy. Recorded from Chapada, Rio de Janeiro, Brazil; Kartabo, Bartica, British Guiana; Mexico, New Mexico and Panama. Material studied is from the collections of C. H. Curran, Ohio State University, R. C. Shannon and the author.

THE AENEUS GROUP.

(Plate II, Figs. 17, 20.)

Species distinguished primarily by the spotted eyes, and by the bare eyes on the upper half. The thorax is usually longitudinally striped and the species are often metallic in coloration. A group containing a large number of Oriental and African species, often separated under the genus *Lathyrrophthalmus*. The species are, as Bezzi has remarked, quite variable in some of their characters. Still the group is a useful one. Many of the species are of brilliant coloration and this is particularly true of the sole representative in North America. The latter, *Eristalis æneus* Scop., is a common, widespread and well known species. It is slightly smaller than the average *Eristalis*, almost wholly metallic greenish or brassy, usually with five opaque longitudinal vittæ on the dorsum of the thorax. According to Herve Bazin, the form with striped thorax is the variety *taphicus* Wd. This form is represented in Figure 17. The arista is bare, microscopically pubescent.

THE DIMIDIATUS GROUP.

(Group description.)

Eyes pilose on the upper anterior portion. Antennæ typically dark brown, red or black; arista plumose to bare and microscopically pubescent. Cheeks shining black; ground color of face dark, pile light in color. Facial stripe and prominent "knob" or tubercle, shining black to dark brown or red. Pile of vertex and the lower part of occiput rather long abundant.

Thorax some shade of dark brown or black; usually highly shining and unicolorous; sometimes very obscure darker areas may be seen at an angle. Scutellum likewise shining, as a rule nearly concolorous with the thorax. Pleuræ black or brown. Pile of thorax and scutellum abundant but rather short, generally light in color.

Abdomen in most species highly shining, less so on the second segment; following segments rarely wholly shining, usually with posterior or anterior opaque marginal bands, often interrupted or broken up into spots. Light colored spots of fore part of abdomen always more distinct in the male, very often obsolete in the female, occasionally in the male. Segments two, three and four with the characteristic narrow yellow marginal bands posteriorly. Pile thick but quite short; variable in color. Legs usually characteristically marked; mostly shining black, with the basal half of all the tibiæ sharply yellow, sometimes whitish. Hind femora slender. Wings seldom wholly hyaline, usually with an infuscation on the anterior half, heaviest about the stigma, sometimes with a well defined black or brownish spot; decidedly variable.

One of the most troublesome groups in the genus. The recognition in this country of *nemorum* and *rupium*, both European species, by Dr. R. C. Osburn (Jour. New York Ent. Soc. XXIII,

139) and the variability of certain forms, together with some little sexual dimorphism in certain species, all adds to their complexity and the difficulty of separating them out. Distinctions between species, based on wing markings, are highly variable and untrustworthy; only *dimidiatus* has really hyaline wings and it not perfectly. The black opaque markings of the third abdominal segment, so often made use of, are distinct in only three species and in the remainder variable. The characters here used are a combination of the opaque markings of the abdomen, color of the legs, pile, antennæ and general coloration. Great care has been taken to use those characters most easily discernible and least variable; with all the caution that has been used there must still remain many imperfections. The group is considered characterized by their general strong shining appearance and comparatively short pile, usual dark coloration, etc., in contrast to more opaque species such as *arbustorum*, *brousi*, etc. This latter group finds several members in Europe. As it cannot be denied that certain specimens of *arbustorum* and *brousi* become somewhat "shining on the thorax," though decidedly opaque upon the abdomen, these two species have also been included in the key. The plumosity of the arista in the *dimidiatus* group varies considerably. We find on one hand, tolerably plumose species such as *rupium*, with ten to twelve plumulæ, *saxorum* with six or eight, *dimidiatus* with only two or three, and on the other hand *latifrons* with none. In *obscurus* there are a number of short hairs; it can hardly be called plumose.

Among the older species of this country, *obscurus* seems not to have been well understood; large series of what I have considered this species, as well as several other species, have been taken by Professor J. S. Hine in Alaska, and have enabled the writer, perhaps, to characterize them better. *Eristalis inornatus* has not been certainly recognized. Originally described from a single poorly preserved specimen. Although it has been reported as taken several times since, the writer feels sure that most if not all of these have been confused with other members of the group; one specimen that has come to hand, identified as *inornatus*, turns out to be *rupium*.

KEY TO THE SPECIES OF THE *Dimidiatus* GROUP.

1. Basal third of hind tibiæ light yellowish.....2
 Basal third of hind tibiæ not of this color (*obsoleta* group).....*tenax* Linne.
2. Basal two-thirds of wing margin brown in color.....*compactus* Walk.
 Basal two-thirds not of this color; nearly or completely hyaline or with infuscated spot near stigma.....3

3. Posterior margin of third segment with a fringe of pale golden pile; opaque markings limited to two widely separated oval spots, or entirely lacking. *latifrons* Lw.
Not with a fringe of pale golden pile on third segment; opaque markings usually in the form of bands, sometimes spots, rarely absent. 4
4. Thorax deep bluish black; opaque bands of third abdominal segment complete; wings always with a spot in neighborhood of stigma. . . *saxorum* Wied.
Thorax not of that color. 5
5. Third abdominal segment with a widely interrupted opaque cross band; third and fourth segments each with a small median, anterior opaque spot; wings hyaline. *dimidiatus* Wd.
Third and fourth segments of abdomen not as above; wings hyaline or infuscated. 6
6. Males. 7
Females. 13
7. Basal joints of hind tarsi pale in color. *rupium* Fabr.
Basal joints of hind tarsi dark. 8
8. Third and fourth abdominal segments with a median, opaque, elongate spot. 9
Third and fourth abdominal segments not with such a spot. 10
9. Spots of second abdominal segment highly shining at least in part, yellow; pile of thorax light yellow; shining facial stripe prominent. *temporalis* Thomp.
Spots of second abdominal segment opaque or very feebly shining; pile light brownish to reddish; facial stripe usually quite narrow or lacking. 10
10. Yellow of second and third segments confluent for nearly its width; dorsum of thorax usually with faint darker spots; shining facial stripe very narrow to obsolete. 11
Black of second segment posteriorly reaching nearly to the lateral margins; thorax entirely unicolorous; shining facial stripe prominent. 12
11. Basal joint of middle tarsi yellowish except at tip; a transverse basal band of opaque black on fourth segment. *arbustorum* Linne
Basal joint of middle tarsi entirely brown; fourth segment with a minute basal spot of opaque black or entirely shining. *brousi* Will.
12. Pile of face and thorax yellowish to reddish; usually with light spots on third abdominal segment; ground color of face light. *nemorum* Linne
Pile of face and fourth abdominal segment white; light spots only on second segment; ground color of face black. *obscurus* Lw.
13. Second abdominal segment very feebly shining; dorsum of thorax with faintly indicated darker spots; shining facial stripe very narrow or lacking (*arbustorum* group). 14
Second abdominal segment at least in part highly shining; thorax entirely unicolorous; facial stripes quite prominent. 15
14. Basal joint of middle tarsi yellowish except at tip; a transverse basal band of opaque black on fourth segment. *arbustorum* Linne
Basal joint of middle tarsi entirely brown; fourth segment with a minute basal spot of opaque black or entirely shining. *brousi* Will.
15. Light markings of second abdominal segment usually large or quite distinct; third and fourth segments with a median opaque elongated spot; pile yellowish, never brownish on dorsum of thorax. *temporalis* Thomp.
Light markings usually nearly obsolete or much suppressed. 16
16. Thorax more brown; pile brownish to reddish. *nemorum* Linne.
Blackish species, particularly on the thorax; pile pale yellow to whitish. . . 17
17. Basal joints of hind tarsi pale; third joint of antennæ red to dark reddish brown; infuscated spot of wing quite distinct at least from the basal half of the wing. *rupium* Fabr.
Basal joint of hind tarsi dark in color; third joint on antennæ black, never dark brown or red; infuscation of wing much lighter and diffused over the whole basal anterior portion of wings to stigma (see discussion under *temporalis*. *obscurus* Lw.

Eristalis dimidiatus Wied.

Male, female. Antennæ black. Facial stripe and cheeks shining black; ground color of face black; pile of face, vertex and front pale yellowish white, on upper part of vertex black. Thorax wholly shining greenish black, with three very faint opaque vittæ; scutellum nearly concolorous. Pile of thorax wholly pale yellowish. Second segment of abdomen black, a light brownish spot on either side, occasionally obsolescent, is separated by black in the middle of the segment. Remaining segments wholly black. Third and fourth segments wholly shining save for a median anterior opaque spot on each and an oval spot on each side of the third segment, posteriorly. Posterior marginal bands of segments whitish. Legs shining black, the basal half of all the tibiæ pale yellowish white, usually sharply marked. Wings hyaline, rarely with a slight infuscation on the middle of the anterior half. Length: 10–13 mm.

Perhaps the commonest, or at least the best known species in the group. The characters that at once mark the species are its black color, greenish or brownish black thorax, characteristic opaque spots of third and fourth segments and the whitish areas on the tibiæ.

Eristalis latifrons Lw.

Male, female. Antennæ black, arista bare to microscopically pubescent; facial stripes and cheeks shining black. Pile of face, front and vertex, pale yellowish white, longer than in most species of the group. Thorax greenish brown, shining, with no traces of opaque markings. Scutellum yellowish brown. Pile of thorax rather thick, yellow. Abdomen greenish black; first segments with yellowish brown spots on each side, widely separated medianly, frequently obsolescent or totally absent. Abdomen wholly shining; an interrupted opaque posterior band on the second segment, occasionally an oval, opaque spot on each side of the third segment in the male. Posterior margins of second, third and fourth segments whitish, with a characteristic fringe of rather long, pale pile. Apices of femora and abasal half of tibiæ yellowish; legs otherwise shining black. Wings sometimes hyaline; usually with a brownish spot in the middle of the anterior half. Length 9–14 mm.

A widespread species, more abundant in the southern half of the United States. The almost wholly shining abdomen, marginal fringe of whitish pile, greenish color, etc., all serve to make the species a characteristic one.

Eristalis saxorum Wied.

Male, female. Antennæ black, sometimes dark reddish brown; arista slightly plumose basally. Facial stripe, cheeks and ground color of the face, black. Pile of face white, of upper half of front and vertex,

black. Thorax black, with strong metallic bluish reflections. Scutellum of a similar color and reflection; but often dark reddish brown. Pile of thorax short, longer on the pleuræ, pale in color. Abdomen black; a light brownish spot on either side of the second segment, quite frequently obsolescent, and widely separated medianly; narrow yellow posterior marginal bands usually prominent; often with a quite strong bluish tinge, and the segments highly shining, even sometimes metallic. Second segment largely opaque save on the spots; third and fourth segments with characteristic opaque, marginal bands, on both anterior and posterior portions, the anterior band sometimes obsolescent. Legs typical for the group; light area of the tibiæ, whitish. Wings always with a fairly well defined brown stripe or spot, on the middle and anterior half, variable in extent. Length 10-13 mm.

A common, well known species, seemingly limited to the northern half of the eastern United States. Professor J. S. Hine tells me he has never met with the species in Ohio. It is recorded from the District of Columbia. My material is from Massachusetts and New York. Distinguished by its strongly steel blue coloration, and largely shining to metallic abdomen.

Eristalis compactus Walk.

Male, female. Antennæ, bright brownish orange, in two specimens reddish brown; quite large, two-thirds to twice larger than usual. Facial stripe wide, it and cheeks shining black; ground color of face black. Pile of face light, rather short and sparse, in considerable contrast to such forms as *latifrons*, *nemorum*, etc.; pile yellowish on front and vertex and black about the ocelli, sometimes black on the front likewise. Face more produced below than in other species. Eyes wholly pilose. Thorax dark shining brown, scutellum strongly reddish; pile of former light yellowish brown on top, reddish on the sides; on the latter black upon the disc, yellowish on the margin. Abdomen black, the spots of the second segment strongly reddish; the narrow yellow posterior marginal bands very prominent, largely shining; opaque bands on the second, third and fourth segments, often obsolescent. Pile on spots of second segment bright golden red. Legs yellowish red, basal half of hind femora, greater part of front and middle femora and last two joints of the tarsi, black. Wings with a characteristic brownish band on anterior basal portion of wing. Length 9-10 mm.

A short, stout, compact little *Eristalis*, well deserving its name. The band of the wing and the shining reddish coloration separate it at once from its congeners. Specimens studied are from New York and New Hampshire. Specimens received from Mr. Raymond C. Shannon were taken on flowers of *Caltha palustris*.

Eristalis temporalis Thompson.

Male, female. Antennæ very dark brownish black; arista slightly plumose basally; facial stripe prominent, together with cheeks shining black; ground color of face black. Pile of face light brownish yellow in color, sparse; on front and vertex similarly colored. Face and front of female unusually broad. Thorax dark shining, greenish or brownish black. Scutellum not quite so dark, brownish, shining. Abdomen greenish or brownish black; second segment with a shining, large, prominent, sharply marked, brownish yellow spot on either side, rather widely separated by opaque black medianly. The posterior marginal bands of the segment unusually prominent, light yellow. Segments three and four shining, save for an opaque, posterior, rarely interrupted band on the third segment and a median anterior "dagger-like" spot on both third and fourth segments. Legs black, moderately shining, bases of hind femora, apices of all the femora, basal half of hind and front tibiae, greater part of middle tibiae basally, pale yellowish. Wings hyaline, or very faintly, scarcely perceptibly, infuscated in the middle and anterior half. Length: 10-15 mm.

The above description may be considered typical; description of one or two variations are given below.

With this and the following three species, "our trouble begins." The discovery of certain European species within the confines of North America has not seemed to clarify a situation, already perplexing enough, due to older species being poorly understood and studied from but few specimens. The writer has studied good series of most of the forms and believes he has come to a fairly good understanding of their characters; the obscurity of these, however, renders their description a most difficult matter.

A study of a series of specimens betrays several interesting facts. The females are found to be more difficultly distinguishable and are further found to be more "shining" than the males.

Eristalis temporalis differs from all the others in at least one respect; in both males and females of the typical variety, the light colored spots of the abdomen are about equally prominent.

The males of the typical variety can only be confused with *obscurus* and a variety of *nemorum*. This variety of *nemorum*, as will be further discussed under that species, is a form which lacks the second pair of light spots on the abdomen. Typically this species seems to have light brownish spots on both the second and third segments. From the variation, *temporalis* may be distinguished by the pale yellow color of its pile, the wholly shining thorax, with never a trace of darker spots or bands, and

the yellow abdominal spots. The spots of *nemorum* are reddish, the pile and the whole insect has a reddish or fulvous appearance; the thorax is considerably more opaque, with traces of dark spots or vittæ, etc. Occasionally one finds *nemorum* with only deep yellow pile. In *nemorum* there are traces of a median dagger like spot on the third and fourth segments, never so prominent as is usually found in *temporalis*. The males of *rupium* likewise exist in a similar variety to that of *nemorum*; they may be at once separated from *temporalis* by the well defined infuscation of the wings, reddish color, etc.

The females of the typical form, can not be confused with the others; in all the remaining species the females have the light spots of the abdomen obsolescent.

A certain form of female in this group is quite commonly collected, often among *temporalis*, and is usually considered to be a variety of that species. It is, however, very much closer to the females of *obscurus*, and as I shall show below, almost indistinguishable from them. Still the one character which links it with *temporalis*, I believe to be more important than the several by which it resembles the female of *obscurus*. It is a peculiar situation. Specimens of the form are nearly always found among collections of *temporalis*. The true *obscurus*, about the validity of which there can be no doubt, is too poorly known at present, for us to say what species or forms consort with it. The chief difference of the variation lies in the fact that the light spots of the abdomen are entirely obsolescent.

What I consider the females of *obscurus*, have been taken from a large series of that species, associated in the fields with the males, and collected by Professor J. S. Hine in Alaska. These males of *obscurus* seem quite distinct. The variety above mentioned, which I shall call *beta*, n. var. (vide inf.), for it is certainly a variety whatever the species, further departs from *temporalis* and resembles *obscurus*, in having the pronounced, shining greenish black color of the latter, together with very narrow yellow, posterior bands on the segments. The marginal bands in the former species are much wider. This species has always been considered the exclusive possessor of dagger-like median spots on the third and fourth segments, but traces of such may be found in all degrees, in *obscurus*, and, as already remarked, in *nemorum*. They are frequently absent in these two species; I have never seen them lacking in *temporalis*. The

variety *beta* agrees with *obscurus* in having these spots usually slight. In *temporalis* the wings are substantially hyaline; in all my specimens of *beta* and *obscurus* there is a distinct infuscation in the stigmal area of the wings. In one respect the specimens of the variety differ from *obscurus* and agree with *temporalis*; the latter species has the middle tibiae yellowish for their basal two-thirds or more, while in the other, never more than the basal half is yellow.

The males of the species differ from the males of *obscurus* in the following respects: in the latter species the abdomen is considerably less shining, the light spots of the second segment in particular, nearly opaque (shining in *temporalis*), and of a pale yellowish white color. The pile of the fourth segment wholly white; usually yellowish in the other species.

Two males that differ in having the femora as well as the tibiae and tarsi, largely yellowish, I call variety *alpha*. n. var. (vid. inf.). In some intangible way the yellow of the abdominal spots is deeper and more conspicuous. It closely approaches certain European forms, from which it is, however, quite different.

Some sixty or seventy specimens of *temporalis* have been studied from British Columbia, Oregon, California and Wisconsin.

Variety *beta* n. var. All females; type: Banf, Alberta, June 11; paratypes: Stanford U., Calif., June 16, 1910; Walnut Creek, Calif.; Mary's Peak, Oregon (In the author's collection).

Variety *alpha* n. var.; type, a male, Banf, Alberta (J. F.). In the author's collection.

Eristalis rupium Fabr.

Female. Antennae usually dark brown or red, never black, sometimes rather light reddish; first two joints always shining black; arista plumose on the basal half. Cheeks shining black. Face shining; it and ground color of face vary from a rather light reddish color to black; face somewhat pollinose, pile sparse, yellowish white in color. Pile of front and vertex yellowish to white; blackish about the ocelli. Thorax dark shining brownish black, no darker markings on the disc; scutellum concolorous, pile yellowish. Abdomen shining black; second segment opaque black, the spots always obsolete, metallic, black and shining. Third and fourth segments with opaque bands posteriorly and narrower bands, sometimes lacking, anteriorly; bands of both segments often interrupted. Hind femora, except basally and apically, front and middle tibiae femora, save on their apices apical half of hind tibiae, apices of remaining tibiae and last two joints of all the tarsi, black; otherwise

yellow or reddish. Wings with a dark brown infuscation in the middle and on the anterior half, sharply delimited from the basal half of the wing, although it may be surrounded by lighter infuscation on either side.

Male. The antennæ very dark brown; facial stripe and cheeks very dark brown; facial stripe and cheeks shining black; ground color of face black, plainly apparent beneath the light, irregular pollen and sparse brownish yellow pile; pile on front and vertex fulvous. Thorax wholly dark shining brown, color obscured by dense, reddish or fulvous pile. Scutellum similar in color and pile. Abdomen black, a rather large, shining, strongly reddish spot on either side of the second, and usually a similar, smaller spot on either side of the third segment. Fourth segment wholly black. Opaque bands nearly as in the female. Legs as in the female, except that the hind femora are entirely black, with the exception of the narrow apices. Wings similar. Length: 9-12 mm.

The male of *rupium* has been discussed under *temporalis*; its reddish color, stigmal spot, and spots on (usually) both second and third segments, characterize it; *nemorum* (male) resembles it in reddish coloration, but has the wings practically hyaline. The female of *rupium* is in strong contrast to the male, the former being largely shining black with no reddish spots on the abdomen. It can be confused only with the female of *obscurus*. Long series of *obscurus* show the degree of infuscation of the wings to be quite variable. However, the infuscation of this species will be found to be lighter and not so sharply marked as in the other species. The antennæ of *rupium* are brown to reddish, in the other, black. Further this form has the hind tarsi basally reddish to yellowish; they are black in *obscurus*.

Recorded from British Columbia by Dr. R. C. Osburn. I have additional British Columbian specimens, seven females from Wallface, New York (A. S. Nicolay), one female from Moss Pond, New York (R. C. Shannon), as well as European specimens.

Eristalis obscurus Lw.

Male. Antennæ black. Facial stripe and cheeks shining black; ground color of face black, slightly pollinose, sparsely yellowish white pilose. Thorax dark greenish black; moderately shining. Scutellum brownish; shining. Pile of thorax nearly wholly pale yellowish; abdomen black, with a pale yellowish white spot on either side of second segment; but slightly shining, more so on third and fourth segments. An opaque band on the posterior margin of the segments, often wanting on the fourth; a similar band on the anterior margin, narrower and produced posteriorly to form a kind of median triangle. Pile of anterior half of second segment and posterior part of fourth nearly white, on remainder of abdomen black.

Infuscation of wings never very great, but always present, diffused more or less over the whole basal two-thirds of the wing on the anterior half. Length: 8-13 mm.

Female. More shining. Spots of abdomen always obsolescent. The female might be confused with that of *nemorum*, the differences with which have been considered under that species.

This form, *obscurus*, of which I have studied a large series collected by Professor J. S. Hine in Alaska, is evidently a distinct one. It presents one or two little discrepancies from the original description. The antennæ of the species are described as reddish ferruginous and also the base of the hind femora as yellowish; the types were males. These two characters are applicable also to the females of *rupium*, but not to the males. I find seven or eight specimens of what I have considered *obscurus* with the bases of the hind femora yellowish in a varying degree; the antennæ are black. The antennæ and face of *inornatus* are likewise described as reddish to ferruginous; the type was a single poorly preserved female. May not Loew have had either *rupium* or *nemorum* or some other European species before him when he described *obscurus* and *inornatus*? My specimens of *obscurus*, so called, are a good species and I have called it this for the present. A study of the types will be necessary to clear the matter up.

Some seventy or eighty specimens, from Alaska, taken by Professor Hine, have been studied.

Eristalis nemorum Linne.

Male. First and second joints of antennæ shining black; third joint reddish to dark brown. Facial stripe and cheeks shining black. Ground color of face black, obscured by dense yellow pollen and pile. Thorax dark brownish black, but moderately shining; dull or obscure spots or bands can usually be made on the dorsum. Scutellum lighter, reddish brown. Pile of thorax, thick, short, and strongly reddish or fulvous, occasionally deep yellow. Abdomen black, second segment with a conspicuous, light reddish brown spot on either side; third segment usually with similar though smaller spots. Third and fourth segments shining, with an opaque band both anteriorly and posteriorly, the former often produced posteriorly in the form of a faint median dash. Legs as in the general type. Wings practically hyaline, faintly infuscated on the stigmal area.

Female. Differing considerably from the male; there are usually traces of the abdominal spots remaining on the second segment; dark reddish brown; the infuscation of the wings more noticeable and greater in extent; not so conspicuously reddish brown as in the male; more shining, etc. Length, 10.5–12.5 mm.

Closest to the female of *obscurus* but distinguished by the brownish to slightly reddish antennæ, yellow pile of face and the brownish to fulvous pile of the thorax.

Recorded by Dr. R. C. Osburn from this country, Journal N. Y. Ent. Soc. XXIII, 144. Additional specimens from Portland, Oregon (Binswanger), Teulon, Manitoba (Hunter and Cummins), and Moscow Mts., Idaho (R. C. Shannon).

Eristalis inornatus Lw.

This species has been reported several times since being described, but with very doubtful determination. Certain of these species examined by the writer, have turned out to be *rupium*, *nemorum*, etc. I should not be greatly surprised if *inornatus* represented one of the above species in some of their variations, or sexual forms.

I have seven specimens separated from a series of *obscurus*, and mentioned under that species, all of which agree among themselves in having the base of the hind tibiæ reddish to yellowish, in varying degree, slightly larger in size, etc.; their antennæ black. The species *inornatus* was described from a female, with reddish hind femora basally, but likewise with ferruginous antennæ; the face was said to be longer, the tubercle less prominent, than in *obscurus*; both these species were described by Williston as similar to *E. dimidiatus*. Like *obscurus*, a study of the type is necessary before definite conclusions may be attained. Both this species and *obscurus* were described from the Red River of the North. The length of the former was given as 13 mm.

Recently a species has been described within this group from Colorado, by Mr. E. E. Wehr (Univ. Studies, Vol. XXII, p. 151, 1922). The form, which he called *nitidus*, is of doubtful relationships; from a perusal of the description, as I have not been afforded opportunity to examine a paratype, it would seem probably nothing more than one of the European forms that have confused our American species. The name is preoccupied by Van der Wulp from an East Indian species.

THE OBSOLETUS GROUP.

(Group description.)

The obsoletus group contains a small number of species, at first sight rather dissimilar, but with more study, appearing somewhat closely related. Of the five species which I have seen and placed within this group, all are of large size, stout and robust build. A brief description of their characters, and the points on which they agree, follows.

Antennæ always broadly oval, but little longer than broad; normal in size; arista bare; bristle of second antennal joint unusually strong and prominent. Eyes unusually hairy for an *Eristalis*; the pile, while extensive, is usually lacking or short, on the lower third. Eyes of female narrow to widely separated. Face very sparsely pilose, and thinly pollinose; facial stripe ill defined, and usually limited to the central knob, or tubercular prominence. Thoracic dorsum opaque, or very feebly shining, practically unicolorous, with usually but faint indications of vittæ or fascia. Scutellum opaque, sometimes polished on the rim. Abdomen short and stout, generally highly shining; frequently unicolorous, sometimes obscurely marked with brown or black; segments with the usual, narrow, posterior, yellow marginal bands, frequently wanting only on the second segment, entirely lacking only in *tenax*. Hind femora usually considerably thickened, rarely slender. Hind tibiæ notably flattened and arcuated, with the lower (outer) surface, densely lined with a row of long, stiff hairs.

The flattening of the tibiæ is found to a slight extent in several groups of the genus, but never to so marked an extent. This is likewise true of the ciliated hind tibiæ. In such species as *obscurus*, *pilosus*, etc., the hind tibiæ are merely sparsely and loosely haired and may then be described as only pilose; in *albifrons*, *pusillus*, etc., a definite row of more loose, quite short bristles or hairs may be found, thus more or less intermediate between the two conditions, but not to be confused with the ciliate tibiæ of the present group. *E. vinetorum*, of the *albifrons* group also has the tibiæ as in this group. Wings usually nearly or entirely hyaline; sometimes with a dark blotch or spot near the middle.

Eristalis tenax, while plainly belonging here, shows several differences. The eyes are banded with two rows of hairs; the abdomen is neither so broad nor so short. *Eristalis mirabilis* while agreeing well with most of the characters above, has the thorax rather strongly banded in some lights. These are, however, rather vague and obscure as compared with members of

the *albifrons* or *scutellaris* groups. Finally, *ruficeps* differs markedly in the type of face, although agreeing well otherwise; in profile it is seen to be considerably swollen, yet evenly rounded with the facial prominence practically absent; very slightly excavated below the antennæ.

KEY TO THE SPECIES OF THE *Obsoleta* GROUP.

1. Face and thorax black. *pygolampus* Wied.
 Thorax brown to reddish or yellowish, never black. 2
2. Thoracic dorsum entirely yellowish to reddish brown. 3
 Thorax with indistinct transverse fasciæ. 4
3. Pile of thorax light yellow; third joint of antennæ dark brown or black.
 tenax Linne.
 Pile of thorax reddish; third joint of antennæ light reddish brown. 5
4. An obscure, transverse, black band before the suture; wings with a large brown spot near the middle; pile of front and vertex. *mirabilis* n. sp.
 No such black band on the thorax; wings only slightly infuscated; pile of front and vertex light. *obsoleta* Wied.
5. Prominence of face indistinct; face swollen, evenly rounded; hind femora not thickened; all the femora nearly all black. *ruficeps* Macq.
 Tubercle of face prominent; face not evenly rounded; hind femora considerably thickened, usually reddish. *obsoleta* Wied.

Eristalis pygolampus Wied.

Male, female. Antennæ dark reddish brown; arista of the same color. Ground color of face black, covered with a scanty, dark brown pollen and a very few moderately long, golden hairs, sometimes whitish. Pile of front more abundant, black at vertex and just above antennæ, yellow between. Facial stripe and cheeks shining black. Thorax opaque, velvet black; in one somewhat teneral specimen, there are very faint fasciæ anteriorly, and posteriorly shining, with a bluish cast. Scutellum deep red, opaque, shining on the rim. Abdomen shining black, more brassy on the third and fourth segments, marked by opaque black as follows: Second segment with a median anterior spot and a posterior marginal band; third segment with a similar, smaller spot and a narrower posterior band. Third and fourth segments with a narrow, posterior, marginal band, widened medianly, of an opaque yellow, pollinose nature. Femora shining black, black haired; hind tibiæ black. Front and middle tibiæ and all the tarsi, light brownish or reddish yellow, yellow haired. Wings nearly hyaline, with a large brownish black spot in the middle. Length, 12–14 mm.

Three specimens. Itaquauecetuba (F. R. Cole), Brazil; Bartica, British Guiana; Sao Paulo, Brazil.

The single male is slightly teneral; the common, "white pollinose line" of the thorax, mentioned in the original description is obscurely present, but with not a trace of it present in the two females. The yellow of the front, as described, seems normally to extend over only the small, bare, calloused area, present above the antennæ commonly within the genus.

Eristalis tenax Linne.

Male, female. Little need be said of this common and cosmopolitan species, save in a comparative way with the other members of its group. While of the same broad, stout form, its appearance is changed by the more flattened abdomen and more deeply projecting face. The only species of the group with a complete facial stripe and likewise with heavy pruinescence on the face. Antennæ dark brownish black. Cheeks black; facial stripe, shining, very dark brown. Pruinescence of face, pale yellowish brown. Thorax opaque dark brown, sometimes slightly shining; not unicolorous as apparent at first sight; a very obscure, wide, darker stripe, may be seen on either side of the thorax, broken at the suture, apparent in many specimens. Pile very dense, but short, pale brown. Abdomen shining, dark brown, almost black, with a light, oval, yellowish brown spot on either side of the second segment, frequently obsolescent. In a varietal form, the whole basal half of the third segment of the male, is similarly colored, narrowly interrupted medianly with black. In the female it is confined to a slender, transverse, medianly interrupted band, in the middle of the segment. Legs dark brown; basal third of front and hind tibiæ, and larger part of middle tibiæ and first two joints of middle tarsi, pale yellowish; front and hind tarsi, and last three joints of middle tarsi, dark brown. Wings nearly hyaline, sometimes faintly clouded in the middle. Length, 12–15 mm.

A universally common species, yet oftentimes local, due probably to the nature of its breeding places.

Eristalis mirabilis n. sp.

(Plate II, Fig. 11.)

Female. Antennæ dark brownish red. Facial spot shining reddish brown. Cheeks shining black. Ground color face reddish brown. Pruinescence of face brownish yellow; pile whitish. Front dark brown, becoming black at the vertex, opaque except just before the antennæ; pile blackish. Thorax with rather prominent fascia for a member of the group. A band between the humeri, dark brown, opaque; immediately behind, a narrow black band, followed by the narrow, obscure, interrupted white line before the suture. Behind the suture, a wide black band. Remainder of thorax, shining grayish black. Scutellum opaque, light reddish brown, shining on the rim. Pile of thorax and scutellum strongly brownish red. Abdomen shining black, marked by opaque black as follows: a median band on the second segment continuous posteriorly with a marginal band of the same width; third segment with a small median spot and posterior margin with a band; fourth segment with marginal bands, anteriorly and posteriorly. All the femora and hind tibiæ, shining black; anterior and middle tibiæ dark brown; all the tarsi light brownish red. Wings slightly tinged with brown, with a large brownish black spot in the middle. Length 15 mm.

Type, one female, Vista Nieve, Columbia. Nov. 16, 1922. (H. L. Viereck). Type in the collection of C. H. Curran.

In some respects resembling *pygolampus*, but differing in the color of the face and scutellum, bands of thorax, pile of thorax, etc.

Eristalis obsoletus Wied.

Male, female. Antennæ dark to light reddish brown; facial spot of the same color. Cheeks and ground color of face shining black, the latter sometimes nearly bare, usually obscured by dense, pale pruinescence; pile of face whitish. Pile of face and front very variable. In the males, pile of face rather abundant, golden; of front, above antennæ, yellow, intermixed with black, sometimes wholly black; of vertex golden. In the females, the pile of front and face is very thick, often wholly pale yellow; sometimes very largely black on front and vertex. Thorax very dark, opaque brown, heavily obscured by pile, in some cases bright fulvous, again light brownish yellow. Scutellum opaque, light reddish brown, shining on the rim; pile of the same color. Thorax nearly unicolorous, only the pale interrupted, sutural lines being present. Abdomen shining, dark brownish black, a large light brownish red spot on either side of the second segment; narrow, yellow, posterior marginal bands of segments often unusually prominent. In the male, conspicuous bands of black pile posteriorly, on segments two, three and four, are contrasted with bands of pale yellowish pile, anteriorly; sometimes abdomen wholly yellow pilose. Narrow bands of opaque black, on the posterior margins of the same segments, and a similar, small median spot, on the anterior margins of third and fourth segments. In the female the pile is usually wholly yellow, never with conspicuous bands of black and yellow pile. Light spots of second segment frequently obsolete. Two male specimens are considerably smaller, very dark, with the shining bands of the third and fourth segments very metallic. In the males the femora are wholly shining black, with the exception of the narrow apices; hind tibiæ black, narrowly pale yellowish basally; front and middle tibiæ brown, yellowish basally; tarsi light reddish brown, pile golden. Legs of female shining red, femora rarely black, paler on the tibiæ and tarsi; bases of tibiæ pale yellowish. Hind femora strongly thickened. Wings nearly hyaline, with a small brown spot near the stigma, sharply delimited basally. Length, 10-15 mm.

A very variable species. Nearly thirty specimens, from Guatemala; Chapada, Sao Paulo, Brazil; Yucatan, Mexico; Bartica, British Guiana. Also numerous specimens from San Diego, and Mill Creek Canyon, San Bernardino Co., California. (F. R. Cole).

Eristalis ruficeps Macq.

(Plate II, Fig. 10.)

Female. Head very large; face swollen. Antennæ light brownish red. Face and front very wide, the former light reddish brown; front slightly darker, vertex blackish. Pile of face abundant, pale yellowish brown, darker and more reddish on front and vertex. Cheeks shining black. Facial spot small, prominence practically lacking; face in profile evenly rounded, very slightly retreating below the antennæ. Thorax practically unicolorous, dark opaque brown, obscured by very dense, reddish pile. Scutellum, light brownish yellow, wholly opaque; pile concolorous. Abdomen shining black, with a more or less quadrate, reddish brown spot on either side of the second segment. Second segment with a wide, black, opaque band medianly, and a similar band on the posterior margin. Similar narrow bands, on the anterior and posterior margins of the third and fourth segments. Hind femora slender; all the femora shining black, narrow apices of anterior and middle pairs, yellow. Hind tibiæ black, narrowly yellow basally; all the tarsi and the remaining tibiæ, dark brown, the latter basally yellowish. Length, 18 mm.

One female. Coroico Yungas, Bolivia. April 5, 1899. (Ohio State University Collection.)

THE ARBUSTORUM GROUP.

(Group description.)

A small group; species medium to large in size. Antennæ oval in shape, slightly longer than broad; arista bare to short plumose. Eyes densely and long pilose; rather broadly separated. Facial stripe well developed in some; again obsolescent. Face long pilose, though not especially densely; sparsely to heavily pruinose. Thorax nearly opaque, but feebly shining, occasionally more highly, for a short distance in front of the scutellum; nearly unicolorous, marked by obscure spots or bands. Scutellum dark in color; moderately shining. Abdomen largely black, marked to a greater or less degree with yellowish brown or red, basally; of the usual shape. Hind femora quite slender; hind tibiæ normal, or slightly flattened. Wings hyaline.

A group not very sharply separated from the members of the *dimidiatus* group, yet the latter is rendered much more sharply characterized by their removal. The species, while generally opaque on the dorsum of the thorax, they are somewhat shining at the extreme posterior. The species are slightly longer pilose than usual, but are still much shorter than in the

pilosus group, and should not be confused with them on that account.

I have seen only four species falling here. It is most nearly approached within the *dimidiatus* group, by *nemorum*. Although *assimilis* and *bogotensis* are rather large in size, their tibiae are quite normal.

KEY TO THE SPECIES OF THE *Arbustorum* GROUP.

1. Face protruding below the eyes for a distance equal to approximately the thickness of the eyes laterally; 12 to 14 mm. in length; unusually robust species. 2
 Face protruding below the eyes for considerably less than the thickness of the eyes laterally; 8 to 12 mm. in length. (See Figs. 12 and 14) 3
2. Second and usually third segment of abdomen with a large orange red spot *assimilis* Macq.
 Spots usually confined to second segment; yellowish brown in color *bogotensis* Macq.
3. Basal joint of middle tarsi yellowish except at tip; a transverse basal band of opaque black on fourth segment *arbustorum* Linne.
 Basal joint of middle tarsi entirely brown; fourth segment with a minute basal spot of opaque black or entirely shining (Fig. 4) *brousi* Will.

Eristalis assimilis Macq.

(Plate I, Fig. 7; Plate II, Fig. 12.)

Male. Antennæ black. Facial stripe and cheeks shining black. Face reddish brown in ground color, slightly metallic in appearance; sparsely pollinose; pile pale in color. Pile of front and vertex black. Face rather deeply produced. Thorax opaque greenish black or brown, feebly shining, marked by four very obscure, broken, narrow stripes. Pile pale yellow. Scutellum shining, light yellowish brown. Second segment of abdomen bright reddish orange or fulvous, separated by a wide, opaque black median band, continued anteriorly along the greater part of the margin; the yellow broadly continuous on the third segment, separated medianly by a narrow, opaque black spot on the anterior margin, and a larger, metallic brassy black spot, posteriorly. Fourth segment metallic brassy, a narrow anterior marginal band, opaque black, produced to a small point medianly. Femora dark shining brown or black, apices narrowly yellowish; basal half of anterior and hind tibiae, and larger part of middle tibiae, pale yellow; tarsi dark brown or black. Wings hyaline.

Female. Similar to the male. Red of the abdomen confined to the second segment, and very narrowly basally, on the third. Median black band of second segment deeply concave on either side. Length, 14 mm.

Six or eight specimens. Arequipa, Peru. Ohio State University collection.

Eristalis bogotensis Macq.

(Plate II, Fig. 15.)

Male. Face, antennæ, etc., practically the same as in the preceding species. Thorax, opaque greenish black or gray; three slender, obscure,

black stripes, the outer ones broken at the suture. Pile pale brownish yellow. Scutellum shining yellowish brown; subtranslucent. Second segment of the abdomen light brownish yellow on either side, a wide, opaque black stripe medianly, extended anteriorly along the larger part of the anterior margin. Third segment with a small yellow spot in the anterior corners, separated anteriorly by a slender, opaque black band along the anterior margin, produced medianly into a sharp point, and posteriorly by metallic black; a narrow black posterior, marginal band, opaque. Fourth segment wholly metallic black, except for a narrow opaque black band on the anterior margin, produced medianly to a point. Legs nearly as in *assimilis*.

Female. Similar to the male. Yellow of the abdomen confined to two rather small spots on the second segment, surrounded by black on all sides except laterally. Wings nearly hyaline; faintly brownish in the middle. Length, 11–14 mm.

Five specimens. La Paz, Bolivia; Puno, Peru. Previously recorded from Colombia, Bogota, Mexico. Ohio State University collection.

Eristalis arbustorum Linne.

(Plate I, Fig. 5.)

Male. Antennæ dark brown; arista short plumose. Cheeks shining black. Facial stripe a very fine line, usually lacking. Face densely pale yellowish pollinose and pilose. Face much less produced than in the two preceding species. Thorax dark opaque brown, somewhat shining a short space before the scutellum. Scutellum shining dark brown. Pile of thorax, thick, short, brownish yellow. Second segment of abdomen yellow on either side, separated by opaque black medianly, extended anteriorly along the greater part of the margin, sharply cut off posteriorly and not quite reaching the posterior margin. The yellow of the second segment extends broadly on the third, but reaching as much as two-thirds of the length of the segment, only at the extreme edge, sometimes continuous the whole length, and with the narrow yellow posterior margins of the segment. Thus the black of the third segment forms more or less of a large, anteriorly truncate, triangle, the base on the posterior margin, the remaining two sides usually concave. Third segment with a metallic cross band in the middle, very slenderly interrupted medianly. Fourth segment opaque black, a broad, interrupted, metallic cross band in the middle, leaving distinct but narrow, transverse, opaque black bands on the anterior and usually the posterior margins. All the femora black; apices narrowly yellowish. Basal half of front and hind tibiae, and a somewhat greater extent of middle tibiae, pale yellowish, otherwise black. Front and hind tarsi, last four joints of middle tarsi, and a slightly variable apical portion of the basal joint, blackish or dark brown. Wings hyaline, often with brown clouds in the middle.

Female. Similar to the male. The yellow spots confined to the second segment of the abdomen and somewhat smaller; the median

black band wider and considerably dilated posteriorly but not reaching the side margins. Third segment with a metallic cross band, narrowly separated medianly, and opaque black bands on both anterior and posterior margins. Fourth segment similar, with similar, slightly narrower, black marginal bands. Fifth segment wholly shining black. Length, 9-12 mm.

An excessively common species, introduced from Europe, that seems to have largely displaced, in most localities, the indigenous *E. brousi*. Specimens from New Jersey, New York, Connecticut and Ohio, etc.

Eristalis brousi Will.

(Plate I, Fig. 4; Plate II, Fig. 14.)

Practically the same as in *arbustorum*, differing as follows: Male. The velvet black of fourth segment restricted to a very small basal median spot, sometimes wanting, and an occasional trace of similar black in front of the yellow hind border.

The black band of the third segment is slightly less wide. Female. Segments three and four are completely shining save for an occasional very small median, basal spot of opaque black, and a slight trace of the same in front of the yellow hind border. Both sexes differ in the nature of the basal joint of the middle tarsi. In *brousi*, the whole joint is dark brown or black, as are the remaining joints, whereas in *arbustorum*, the greater basal part is yellow or light brownish yellow. Length, 9-12 mm.

Specimens from New Jersey, Quebec, Wyoming, etc.

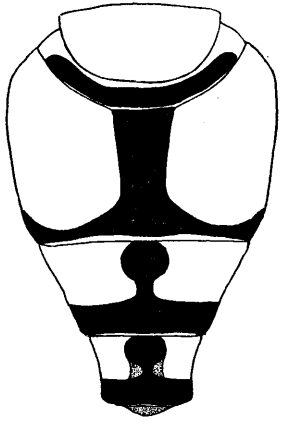
EXPLANATION OF FIGURES.

PLATE I.

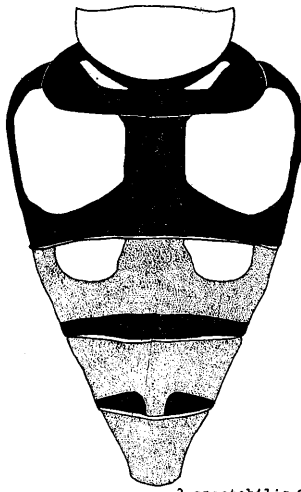
Drawings of *Eristalis*. Heavy stippling represents shining black; light stippling shining yellow. The scutellum of the species are somewhat distorted, especially in figures 4, 5, and 6. No pains have been spared to represent the abdomens themselves, and their markings, as accurately as possible. In Fig. 8 light stippling represents gray.

PLATE II.

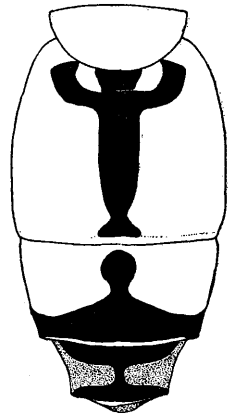
Drawings of *Eristalis*. Figures 11, 15 and 17 show the thorax; Fig. 18, the hind femora and tibiae; Figs. 19 and 20, view of head from above and in front respect; the remainder are profiles of the head. In Fig. 17 stippling represents aeneus; in 11 and 15 light stippling represents gray and dark stippling shining black.



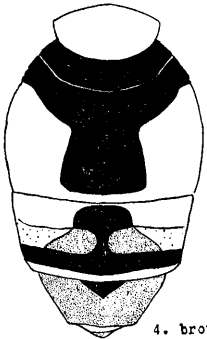
1. *aemulus* ♂



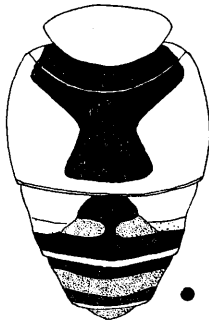
2. *spectabilis* ♀



3. *agrorum* ♂



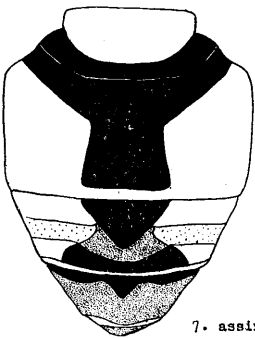
4. *brousi* ♂



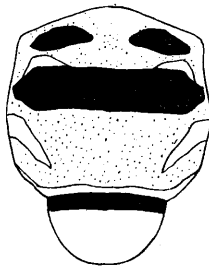
5. *arbustorum* ♂



6. *conicus* ♀



7. *assimilis* ♂

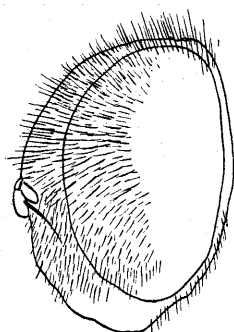


8. *precipuus* ♀

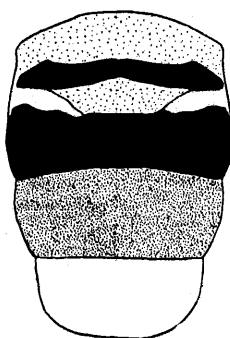


9. *cyathus* ♀

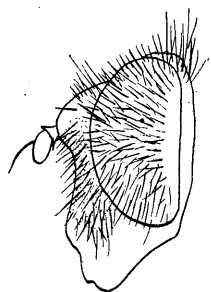
F.M.Hull del.



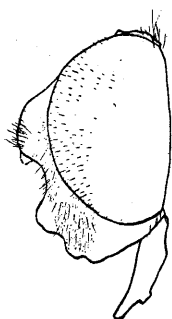
10. *ruficeps* ♀



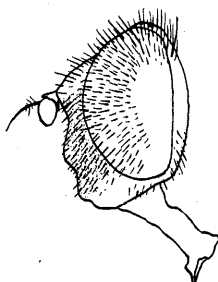
11. *mirabilis* ♀



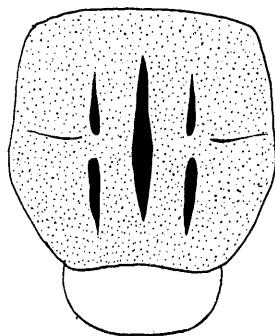
12. *assimilis* ♂



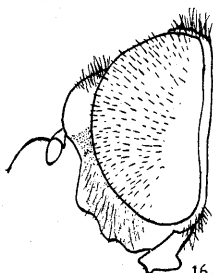
13. *cyathus* ♀



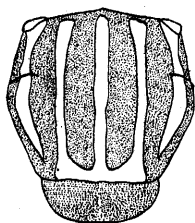
14. *brousi* ♂



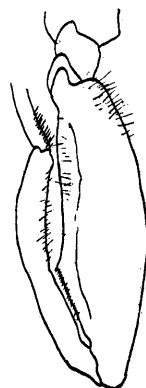
15. *bogotensis* ♀



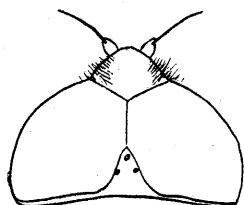
16. *scutellaris* ♂



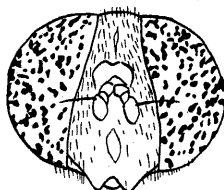
17. *aeneus*
var. *taphicus* ♀



18. *aeneus* ♂



19. *scutellaris* ♂



20. *aeneus* ♀

F.M.Hull del.